IPNS

The Intense Pulsed Neutron Source (IPNS) at Argonne National Laboratory allows scientists to study atomic and molecular structure, dynamics of solids and liquids, and materials in high-density neutron environments.

Based on a proton accelerator rather than on a reactor, IPNS produces neutrons by striking a uranium target with a pulsed beam of protons accelerated to 450 million electron-volts. Greater beam intensity allows more experiments to be performed in less time, and permits many specialized instruments to be used with greater precision and in new areas of research.

Jim Jorgensen (left) of Argonne National Laboratory works with Mary Garbauskas and Ron Arendt of General Electric Co. to prepare an experiment to study the structure of bismuth-based high-temperature superconductors at Argonne's Intense Pulsed Neutron Source.

IPNS researchers examine the structure of high-temperature superconductors, alloys, composites, polymers, catalysts used in oil refining, and materials for advanced energy technologies. Recently developed instruments are used to study properties near the surfaces of magnetic and polymeric materials and to study the structure of liquid and noncrystalline materials.

Accessibility to the facility and its instruments is a high priority. Convenience of use by visiting scientists is further promoted by ancillary equipment and computer facilities. Full-time instrument scientists and scientific assistants and associates help researchers to carry out experiments and to collect and analyze data.

In recent years, users requested nearly three times as much free experimental time as was available. Additional time is available to industrial researchers interested in performing proprietary research and willing to pay full operating costs for beam time.

ACOMPLISHMENTS

Small-angle neutron scattering experiments by Amoco scientists are probing the formation and growth of zeolites, important catalysts in petroleum cracking and refining.

Formation and melting studies of bismuth-based, high-temperature superconductors, carried out by General Electric and Argonne scientists, have led to a better understanding the synthesis of these new materials.

Neutron reflection measurements by scientists from IBM, Northwestern University and Argonne on the diffusion of polymers could help the electronics and chemical industries develop improved polymer bonding and welding techniques.

The precise position of oxygen atoms in yttrium-barium-copper-oxide high-temperature superconductors was first determined by Argonne scientists using the Intense Pulsed Neutron Source.

INTENSE PULSED NEUTRON SOURCE

View along the flight path of a neutron about to enter the new intermediate-angle scattering chamber of the High-Resolution Medium-Energy Chopper Spectrometer (HRMECS) at the Intense Pulsed Neutron Source. At the far end of a total 20-meter flight path is John P. Hammands making t final adjustments to the clusters of detectors.

INDUSTRIAL USERS

- Alcan
- Allied-Signal Research
- Amoco
- Bell Communications
- B. P. Chemicals
- DuPont
- Exxon
- General Electric
- Hoechst-Celanese Research
- IBM
- Lucent Technologies
- Polaroid Corporation
- Schlumberger-Doll Research
- Texaco